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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/615,230	07/08/2003	Oleg Abramov	05854.0021	8381

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EXAMINER

BOMAR, THOMAS S

ART UNIT PAPER NUMBER

3672

DATE MAILED: 11/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/615,230	ABRAMOV ET AL.	
	Examiner	Art Unit	
	Shane Bomar	3672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-37 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 37 is/are allowed.
- 6) ☒ Claim(s) 20-23, 26-29 and 31-35 is/are rejected.
- 7) ☒ Claim(s) 24, 25, 30 and 36 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
 - 1. ☐ Certified copies of the priority documents have been received.
 - 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 20, 21, 27-29, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by US patent 3,583,677 to Phillips.

Regarding claim 20, Phillips discloses a method for increasing the production capacity of wells that contain oil, gas and/or water (see col. 2, lines 17-19), immersing an electro acoustic device 20 in a well bore region of a well, said electro acoustic device comprising a sonotrode and an electro acoustic transducer (see Fig. 1), said sonotrode having a tubular geometric shape with an irradiation surface developed along an axis of said well, wherein dimensions of said tubular geometric shape are determined by operating conditions under resonance parameters of longitudinal and radial vibrations in a natural resonance frequency of said electro acoustic transducer; and using said electro acoustic device to introduce mechanical vibrations in said well bore region along the axis of said well, producing inherent shear vibrations in the well bore region due to displacement of phase of said mechanical vibrations, achieving alternately tension and pressure by superposition of longitudinal and shear waves (see col. 2, lines 23-44 and col. 3, line 5 through col. 5, line 33).

Regarding claims 21 and 29, the waves generated by the device provide an acoustic flow since the device is operating on the principles of acoustics (see col. 4, lines 22-36), with a speed U_f (since U_f has not been defined, whatever the speed of fluid flow from Phillips' method would

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meet this limitation) and a wavelength $\lambda/4$, since this is a commonly known and characteristic wavelength.

Regarding claim 28, Phillips discloses an electro acoustic device for increasing the production capacity of wells that contain oil, gas and/or water comprising an electro acoustic transducer, and a sonotrode having a tubular geometric shape with an irradiation surface developed along an axis of a well (see col. 2, lines 28-33), wherein dimensions of said tubular geometric shape are determined by operating conditions under resonance parameters of longitudinal and radial vibrations in a natural resonance frequency of said electro acoustic transducer (see col. 2, lines 23-27 and col. 3, line 66 through col. 4, line 4); wherein said electro acoustic device is configured to introduce mechanical vibrations in a well bore region along said axis of said well, producing inherent shear vibrations in the well bore region due to displacement of phase of said mechanical vibrations, achieving alternately tension and pressure by superposition of longitudinal and shear waves (see col. 2, lines 23-44 and col. 3, lines 42-65). In regard to the last paragraph of this claim, the limitations presented are seen as merely functional-type language since no structure has been provided or defined in order to show how the electro acoustic device is configured to introduce mechanical vibrations, how the electro acoustic device produces shear vibrations in the well bore region, or how the electro acoustic device achieves alternately tension and pressure by superposition of longitudinal and shear waves. Therefore, in an apparatus claim such as this, the prior art device only need be capable of performing the claimed limitations, which the device taught by Phillips is.

Regarding claims 27 and 32, the electro acoustic transducer is of a piezoelectric type (see col. 3, lines 21-25).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 22 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Phillips in view of US patent 6,491,095 to Kompanek or US patent 5,753,812 to Aron et al.

Regarding claims 22, 33, and 34, Phillips teaches the method and apparatus for increasing production capacity of wells with an electro acoustic transducer, wherein multiple transducers may be used (see col. 3, lines 5-9). However, it is not explicitly taught that a vibratory system is formed with two or more electro acoustic transducers operating in phase, connected at distances that are multiples of half the wavelength of the waves generated.

Kompanek teaches a method and apparatus for increasing production capacity of wells with an electro acoustic transducer similar to that of Phillips. It is further taught that a vibratory system is formed with two or more electro acoustic transducers operating in phase, connected at distances that are multiples of half the wavelength of the waves generated (see Figs. 11-13, and col. 11, line 43 through col. 14, line 20). It would have been obvious to one of ordinary skill in the art, having the teachings of Phillips and Kompanek before him at the time the invention was made, to modify the system taught by Phillips to include the two or more transducers operating in phase of Kompanek, in order to obtain increased amplitude of the vibrations. One would have been motivated to make such a combination since the increased amplitude would increase the production of oil from the formation, thereby increasing the output and money earned from the

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operation. With further respect to claim 34, there are clearly at least two transducers in Figures 11-13, which equates to an even number, wherein the transducers are capable of being configured to operate in antiphase if necessary.

Regarding claim 35, Kompanek can analogously be applied here because it is taught that a plurality of grooves is in the generatrix (see Fig. 9 and the associated description). Aron et al can also analogously be applied because it is taught that a plurality of grooves is in the generatrix (see Figs. 2-4 and the associated descriptions).

5. Claims 22, 23, 26, 31, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Phillips in view of US patent 6,012,521 to Zunkel et al or US patent 3,990,512 to Kuris.

Regarding claims 22, 23, 33, and 34, Phillips teaches the method and apparatus for increasing production capacity of wells with an electro acoustic transducer, wherein multiple transducers may be used (see col. 3, lines 5-9). However, it is not explicitly taught that a vibratory system is formed with two or more electro acoustic transducers operating in phase, connected at distances that are multiples of half the wavelength of the waves generated.

Zunkel et al teach a method and apparatus for increasing production capacity of wells with an electro acoustic transducer similar to that of Phillips. It is further taught that a vibratory system is formed with two or more electro acoustic transducers operating in phase, connected at distances that are multiples of half the wavelength of the waves generated, and that there are an even number (the example arbitrarily picks five, but four or six could also be contemplated within the scope of the art) that can operate in antiphase (see col. 11, lines 43-54). It would have been obvious to one of ordinary skill in the art, having the teachings of Phillips and Zunkel et al

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before him at the time the invention was made, to modify the system taught by Phillips to include the two or more transducers operating in phase or antiphase of Zunkel et al, in order to obtain optimized effects of the energy transmission to the borehole. One would have been motivated to make such a combination since the optimization would increase the production of oil from the formation, thereby increasing the output and money earned from the operation.

Regarding claims 26 and 31, Zunkel et al can analogously be applied here since it is taught that piezoelectric material is notoriously known to be interchangeable with magnetorestrictive material (see col. 3, lines 3-6). Kuris can also analogously be applied since it is taught that piezoelectric material is notoriously known to be interchangeable with magnetorestrictive material (see col. 7, line 65 through col. 8, line 2).

Allowable Subject Matter

6. Claims 24, 25, 30, and 36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claim 37 is allowed.

Response to Arguments

8. Applicant's arguments filed October 3, 2005 have been fully considered but they are not persuasive. The Applicant states that claims 20 and 28 incorporate elements from claims 1 and 6, and claims 3 and 6, respectively, which therefore renders claims 20 and 28 allowable since they contain the subject matter of claim 6 that I previously indicated as allowable subject matter.

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I respectfully disagree with this statement because claim 6 was objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form *including all of the limitations of the base claim and any intervening claims* (emphasis added). Claim 6 depended from claim 5, which depended from claim 4, which depended from claim 3.

Therefore, in order for claim 6 to be properly written in independent form and containing the previously indicated subject matter, each limitation from claims 3-6 would have to also be present.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shane Bomar whose telephone number is 571-272-7026. The examiner can normally be reached on Monday - Thursday from 6:30am to 4:00pm. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bagnell can be reached on 571-272-6999. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


David J. Bagnell
Supervisory Patent Examiner
Art Unit 3672

tsb


November 15, 2005